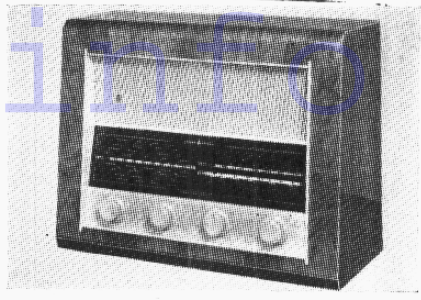


"TRADER" SERVICE SHEET  
**1147**

# BUSH AC34

A.C. Transportable Superhet



EMPLOYING series-fed heaters and an A.C./D.C. range of valves, the Bush AC34 is a 3-band 4-valve (plus rectifier) A.C. transportable table receiver, designed to operate from A.C. mains of 100-120 V and 200-250 V, 40-100 c/s. The waveband ranges are 16-50 m, 182-560 m and 833-2,068 m.  
Release date and original price: August, 1953, £19 12s 9d. Purchase tax extra.

**COMPONENTS AND VALUES**

CAPACITORS		Values	Locations
C1	Aerial series ...	50pF	H4
C2	L.W. aerial shunt...	800pF	G4
C3	S.W. aerial trim. ...	20pF	H4
C4	L.W. aerial trim. ...	60pF	G4
C5	V1 C.G. ...	50pF	G4
C6	A.G.C. decoupling	0.1μF	G4
C7	1st I.F. trans. tuning	110pF	C2
C8	ing ...	110pF	C2
C9	V1 cath. by-pass ...	0.05μF	G3
C10	V1 osc. C.G. ...	45pF	G4
C11	M.W. osc. tracker...	556pF	G3
C12	L.W. osc. tracker...	390pF	G3
C13	L.W. osc. trimmer	180pF	G3
C14	H.T. decoupling ...	0.05μF	G4
C15	A.G.C. decoupling	0.05μF	G4
C16	V2 S.G. decoupling	0.05μF	G4
C17	V2 anode decoup.	0.05μF	F4
C18	2nd I.F. trans. tuning	110pF	B2
C19	ing ...	110pF	B2
C20	V2 cath. by-pass ...	0.05μF	F4
C21*	V3 cath. by-pass ...	50μF	F3
C22	I.F. by-pass ...	100pF	F4
C23	A.F. coupling ...	0.01μF	F3
C24	A.G.C. coupling ...	50pF	F4
C25	Tone corrector ...	0.002μF	F4
C26	A.F. coupling ...	0.01μF	F4
C27	Neg. feed-back ...	0.1μF	F3
C28	Part tone control...	0.05μF	E4
C29	Part tone control...	0.05μF	E3
C30	Tone correctors ...	0.001μF	E4
C31	H.T. smoothing ...	32μF	C2
C32*	H.T. smoothing ...	16μF	C2
C33*	H.T. smoothing ...	16μF	C2
C34†	Aerial tuning ...	52SpF	A2
C35‡	Oscillator tuning ...	52SpF	A1
C36‡	S.W. osc. trimmer...	40pF	H3
C37‡	M.W. osc. trimmer	40pF	H3
C38‡	L.W. osc. trimmer	40pF	G3

**CIRCUIT DESCRIPTION**

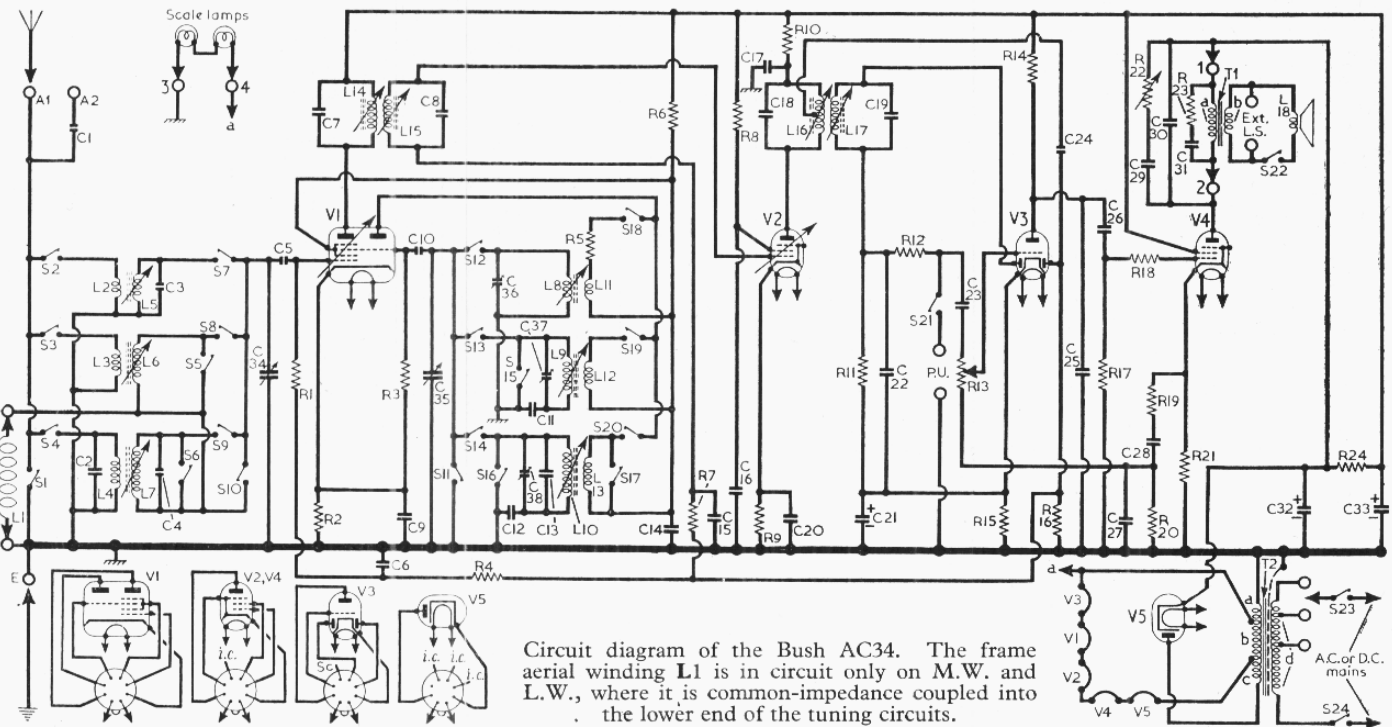
Aerial input via coupling coils L2, L3, L4 to single-tuned circuits L5, C34 (S.W.), L6, C34 (M.W.) and L7, C34 (L.W.), which precede triode hexode valve (V1, Mullard UCH42) operating as frequency changer. Reception from an internal frame aerial L1 is provided on M.W. and L.W., the winding being connected in series

with the chassis end of the two tuning coils. Oscillator grid coils L8, L9 and L10 are tuned by C35. Parallel trimming by C36 (S.W.), C37 (M.W.) and C13, C38 (L.W.); series tracking (Continued col. 1 overleaf)

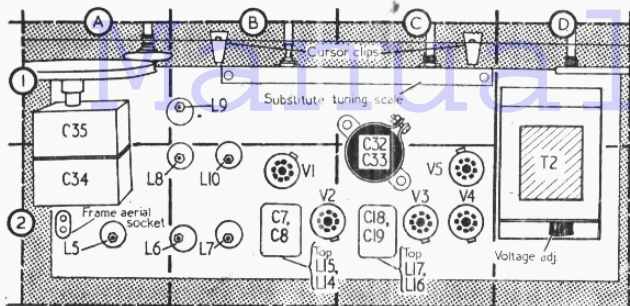
RESISTORS		Values	Locations
R1	V1 C.G. ...	470kΩ	G4
R2	V1 G.B. ...	220Ω	G4
R3	V1 osc. C.G. ...	47kΩ	G4
R4	A.G.C. decoupling	1MΩ	F4
R5	S.W. stabilizer ...	47Ω	H4
R6	H.T. feed	15kΩ	G4
R7	A.G.C. decoupling	2.2MΩ	G4
R8	V2 S.G. decoupling	47kΩ	F4
R9	V2 G.B. ...	330Ω	F4
R10	V2 anode decoup.	10kΩ	F4
R11	Signal diode load ...	330kΩ	F4
R12	L.F. stopper ...	100kΩ	F3
R13	Volume control ...	2.2MΩ	F3
R14	V3 triode load ...	150kΩ	F4
R15	V3 G.B. ...	5.6kΩ	F4
R16	A.G.C. diode load...	1MΩ	F4
R17	V4 C.G. ...	470kΩ	F4
R18	V4 C.G. stopper ...	47kΩ	F4
R19	Neg. feed-back ...	1kΩ	E4
R20	Neg. feed-back ...	10kΩ	F3
R21	V4 G.B. ...	220Ω	E4
R22	Tone control ...	50kΩ	E3
R23	Tone corrector ...	10kΩ	E3
R24	H.T. smoothing ...	10kΩ	E4

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerial ...	0.5	—
L2	Aerial coupling	—	H4
L3	Aerial coupling	0.6	H4
L4	coils ...	32.0	G4
L5	Aerial tuning coils	4.0	H4
L6	Aerial tuning coils	16.0	G4
L7	Aerial tuning coils	—	H3
L8	Oscillator tuning	3.2	H3
L9	coils ...	4.0	G3
L10	Oscillator tuning	—	H3
L11	coils ...	0.6	H3
L12	Oscillator reaction	1.5	G3
L13	coils ...	12.5	C2
L14	1st I.F. trans. { Pri.	12.5	C2
L15	coils ... { Sec.	12.5	C2
L16	2nd I.F. trans. { Pri.	12.5	B2
L17	coils ... { Sec.	12.5	B2
L18	Speech coil	2.5	—
T1	O.P. trans { a	500.0	—
	b	0.5	—
	c	45.2	—
	d	237.0	D2
T2	Mains trans. { total	48.0	—
S1-S21	Waveband/gram sw.	—	H4
S22	Speaker switch ...	—	—
S23, S24	Mains sw., g'd R13	—	F3

\* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Bush AC34. The frame aerial winding L1 is in circuit only on M.W. and L.W., where it is common-impedance coupled into the lower end of the tuning circuits.



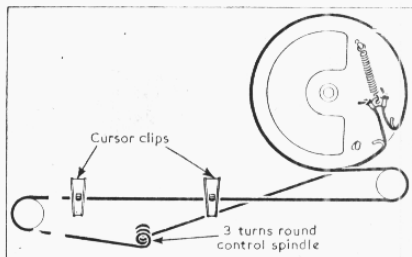
Plan view of chassis showing the position of the substitute tuning scale referred to in "Circuit Alignment."

**Circuit Description—continued**

by C11 (M.W.) and C12 (L.W.). Reaction coupling from anode by L11, L12 and L13. Second valve (V2, Mullard UF41) is a variable- $\mu$  R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings C7, L14, L15, C8 and C18, L16, L17, C19.

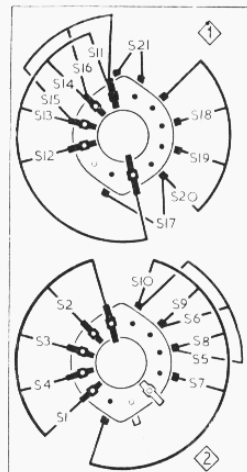
**Intermediate frequency 470 kc/s**

Diode signal detector is part of double diode triode valve (V3, Mullard UBC41). Audio frequency component in its rectified output is developed across diode load resistor R1, and passed via C23 and volume control R13 to grid



Above: Sketch of the tuning drive cord system as seen from the front of an upright chassis.

Left: Diagram of the waveband switch units, which are drawn as seen in the directions indicated by the arrows in the under-chassis illustration.



of triode section. I.F. filtering by C22, R12 and the capacitance of the screened leads.

Second diode of V3 is fed from V2 anode via C24, and the resulting D.C. potential developed across load resistor R16 is fed back as bias to V1 and V2, giving A.G.C.

Resistance-capacitance coupling by R14, C26 and R17 between V3 triode anode and pentode output valve (V4, Mullard UL41). Tone correction in anode circuit by C30, C31 and R23. Variable tone control by R22, C29. Negative feed-back tone correction between V4 cathode circuit and V3 grid circuit via R19, C28, R20, C27.

H.T. current is supplied by I.H.C. half-wave rectifying valve (V5, Mullard UY41). H.T. smoothing by R24 and electrolytic capacitors C32, C33. Valve heaters are connected in series across section b of the mains transformer secondary winding, which is isolated from the mains.

**CIRCUIT ALIGNMENT**

**I.F. Stages.**—Switch receiver to medium waves and tune it to 300 m. Connect output of signal generator, via an 0.1  $\mu$ F capacitor in one lead, to control grid (pin 6) of V2 and chassis, feed in a 470 kc/s (638.3 m) signal and adjust the cores of L17 (location reference C2) and L16 (C2) for maximum output. Transfer signal generator leads to control grid (pin 6) of V1 and chassis, and, feeding in a 470 kc/s signal adjust the cores of L15 (B2) and L14 (B2) for maximum output. Repeat these adjustments until no further improvement results.

**R.F. and Oscillator Stages.**—In order that the receiver may be aligned with the chassis in its cabinet, three holes are provided in the cabinet base to give access to C36, C37 and C38. If, however, the chassis is removed from its cabinet for alignment, the frame aerial should be disconnected and a shorting link placed across the frame aerial sockets. As the tuning scale is fixed to the cabinet, reference should be made in this case to the substitute tuning scale fixed along the front of the chassis deck. A temporary cursor, such as a paper clip, should be fixed to the tuning drive, and, with the gang at maximum, aligned with the datum line on the substitute tuning scale.

**L.W.**—Switch receiver to L.W. and connect signal generator output leads to A and E sockets. Tune receiver to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of L10 (B2) and L7 (B2) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust C38 (G3) for maximum output. Repeat these adjustments until no further improvement results.

**M.W.**—Switch receiver to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of L9 (B1) and L6 (B2) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust C37 (H3) for maximum output. Repeat these adjustments until no further improvement results.

**S.W.**—Switch receiver to S.W., tune to 50 m, feed in a 50 m (6 Mc/s) signal and adjust the cores of L8 (B2) and L5 (A2) for maximum output. Tune receiver to 25 m, feed in a 25 m (12 Mc/s) signal and adjust C36 (H3) for maximum output. Repeat these adjustments until no further improvement results.

**L.W. Check.**—If alignment has been carried out with the chassis out of its cabinet, the cores of L7 and L10 should be re-adjusted for maximum output at 2,000 m (150 kc/s) after the chassis has been replaced in its cabinet and the frame aerial re-connected.

**GENERAL NOTES**

**Switches.**—S1-S21 are the waveband and radio/gram changeover switches, ganged in two rotary units beneath the chassis. These units are indicated in our underside illustration of the chassis and shown in detail in the switch diagram in column 1, where they are drawn as seen in the direction of the indicating arrows in the chassis view. In the associated switch table, a dash indicates open, and c, closed.

S22 is the internal speaker muting switch and is mounted, together with the external speaker sockets, in the top rear corner of the cabinet.

Switches	S.W.	M.W.	L.W.	Gram
S1	—	—	—	c
S2	c	—	—	—
S3	—	c	—	—
S4	—	—	c	—
S5	c	c	—	—
S6	c	c	—	—
S7	c	c	—	—
S8	—	c	—	—
S9	—	—	c	—
S10	—	—	—	c
S11	—	—	—	c
S12	c	—	—	—
S13	—	c	—	—
S14	—	—	c	—
S15	c	c	—	—
S16	c	c	—	—
S17	c	c	—	—
S18	c	—	—	—
S19	—	c	—	—
S20	—	—	c	—
S21	—	—	—	c

**Scale Lamps.**—These are 6.2 V, 0.3 A, lamps with large clear spherical bulbs and M.E.S. bases.

**Drive Cord Replacement.**—About 4ft 6in of nylon braided glass yarn is required for a new drive cord which should be run as shown in the sketch of the drive cord system, starting with the gang at maximum capacitance and running the cord off clockwise round the drum.

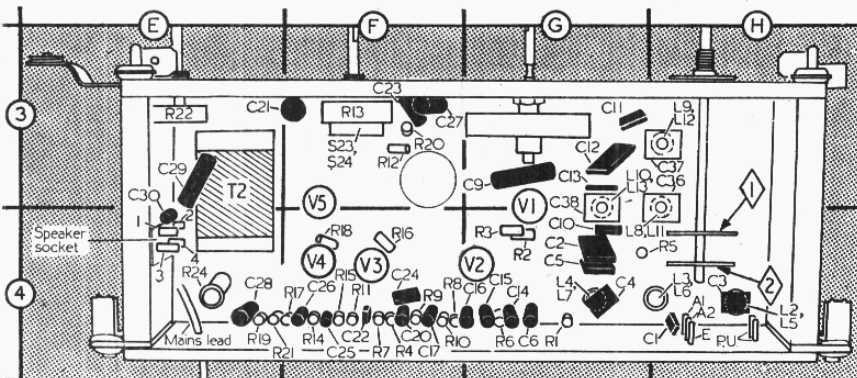
**VALVE ANALYSIS**

Valve voltages and currents given in the table below are those derived from the manufacturer's information. They were measured on a receiver which was operated from A.C. mains of 230 V and tuned to the highest wavelength end of M.W. There was no signal input.

Voltages were measured on the 10 V and 1,000 V ranges of a Model 7 Avometer, chassis being the negative connection in every case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 UCH42	120	3.0	60	1.5	1.2
	Oscillator				
V2 UF41	60	1.5	62	1.5	1.5
	84	3.5			
V3 UBC41	60	0.2	—	—	0.8
V4 UL41	264	31.0	120	4.0	8.0
V5 UY41	263*	—	—	—	282.0†

\* A.C. reading. † Cathode current 46 mA.



Underside view of chassis. The speaker socket in E4 also connects up with the scale lamps.